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Chalk Group macrofossils from the Newbury and Marlborough districts

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Chalk Group macrofossils from the Newbury and Marlborough districts

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Key words

Chalk Group, Macrofossils, Upper Cretaceous, Biostratigraphy, Lithostratigraphy, Chronostratigraphy

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Bibliographical reference

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Foreword

This report details the stratigraphical interpretation of Chalk Group macrofossils from eight localities in the Newbury and Marlborough districts, collected during field work in March 2003. This work was carried out in connection with the current survey of Sheet 267 (Newbury).

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Summary

Chalk Group macrofossils collected during field work in March 2003 demonstrate the occurrence of lower Seaford Chalk Formation in old pits at [SU 2360 6930] and [SU 2274 6927], and this horizon can also probably be inferred from a field brash fauna collected by A R Farrant at [SU 2452 7021]. The middle Seaford Chalk is suggested by the sparse macrofauna collected from a pit at [SU 3104 7008]. The lower Newhaven Chalk Formation was proved in a temporary excavation at [SU 3868 6687] and an old chalk pit at [SU 3439 6449], and the higher part of this formation occurs in an old pit at [SU 3536 6405] and possibly also at [SU 3552 6404].

1 Introduction

Field collecting of macrofossils from the Chalk Group was carried out in March 2003 to assist in the mapping of the Seaford and Newhaven Chalk formations on Sheet 267 (Newbury). The stratigraphy referred to in this report is shown in Table 1, and author citations for fossil species are detailed in Appendix 1.

In this report 'marl' means clay-rich chalk.

2 Locality details

The faunal details and biostratigraphical interpretations and conclusions for the eight localities discussed in this report are described sequentially below:

(1) Old chalk pit c. 1.3 km at 058° from Littlecote Park Farm, near Chilton Foliat, Berks.

1:50 000 267 (Newbury) 1:10 000 SU37SW

NGR: SU 3104 7008

Specimen nos: WMD 8856-8873

The sparse fauna includes the following:

Bivalvia:	*Mimachlamys cretosus?*
	Platyceramus (shell fragments concentrated at single horizon near base of exposure)
Crinoidea:	*Bourgueticrinus* sp.
Echinoidea:	*Micraster* sp. (incomplete)

The section from which the above fauna was collected comprises c. 8.5 m of soft chalk with common large flattened, and locally semitabular flints (Figure 1).

Interpretation: The fauna is biozonally undiagnostic, although not inconsistent with assignment to the middle part of the *M. coranguinum* Zone, and by inference, the middle Seaford Chalk Formation (between the Seven Sisters Flint and the top of the Coniacian), which is characteristically poorly fossiliferous. This assignment is also consistent with the presence of semitabular flints. *Platyceramus* also ranges into the Newhaven Chalk Formation, but the chalk at this level is typically more richly fossiliferous, and semitabular flints are rare.

Conclusion: White Chalk Subgroup, ?middle Seaford Chalk Formation; Late Coniacian, middle *M. coranguinum* Zone.

(2) Old chalk pit on Brick Hill, c. 400 m at 092° from Coombe Farm, near Axford, Wilts.

1:50 000 266 (Marlborough) 1:10 000 SU26NW

NGR: SU 2360 6930

Specimen nos: WMD 8891-8901

ARF 1021-1022

The fauna comprises specimens of the inoceramid bivalves *Platyceramus* and *Volviceramus involutus*. The section from which the fauna was collected comprises c. 6.6 m of soft chalk with common nodular flints, a conspicuous, rusty semitabular flint and three well developed plexus marls (Figure 2). There is also a group of three closely spaced sheet flints (occupying a 0.15 m interval), and a large solution hollow (up to 4 m deep) locally developed at the top of the exposure.

Interpretation: The association of *Volviceramus involutus* and chalk with marl seams and semitabular flints is indicative of the Belle Tout Beds of Mortimore (1986), and the lower Seaford Chalk Formation and lower *M. coranguinum* Zone is indicated.

Conclusion: White Chalk Subgroup, lower Seaford Chalk Formation; Coniacian, lower *M. coranguinum* Zone.

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(3) Old chalk pit c. 100 m at 231° from Stitchcombe Farm, near Axford, Wilts.

1:50 000 266 (Marlborough) 1:10 000 SU26NW

NGR: SU 2274 6927

Specimen nos: WMD 8874 - 8890

The fauna includes common shell fragments of the bivalve *Platyceramus*, and probable shell fragments of the bivalves *Cremnoceramus* and *Volviceramus involutus* (the last collected ex situ). The fauna was collected from c. 8.7 m of chalk with plexus marls and nodular and semitabular flints (Figure 3). The basal 1.2 m of section is in hard, nodular, spongiferous chalk, with shell fragments of *Platyceramus* and *Cremnoceramus*, and contains diffuse concentrations of marl analagous to the marly griotte nodular chalk described by Mortimore (1986).

Interpretation: The above lithology and fauna are largely consistent with assignment to the lower part of the *M. coranguinum* Zone. The association of marly chalk with *Platyceramus*, *Cremnoceramus* and possible *Volviceramus involutus* is indicative of the Belle Tout Beds in the lower part of the Seaford Chalk Formation. The horizon is probably slightly lower than that seen at the nearby Brick Hill chalk pit ((**2**) above), based on the presence of less abundant and mostly thin-shelled *Platyceramus*, and the record of *Cremnoceramus*.

The interval of hard, nodular chalk at the base of the section is more typical of the Lewes Nodular Chalk Formation than the Seaford Chalk Formation. The fact that this hard bed is likely to be coeval with the basal Seaford Chalk Formation of the Sussex stratotype succession is indicated by the presence of fairly common *Platyceramus* shell fragments. This horizon may indicate local induration within the basal Seaford Chalk, or perhaps local inclusion of basal *M. coranguinum* Zone strata into the top of the Lewes Nodular Chalk Formation.

Conclusion: White Chalk Subgroup, ?topmost Lewes Nodular Chalk Formation and basal Seaford Chalk Formation (Belle Tout Beds); Coniacian, basal *M. coranguinum* Zone.

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(4) Field brash on path immediately north of stile, Axford, 1.6 km SW of Ramsbury Manor House, Wilts.

1:50 000 266 (Marlborough) 1:10 000 SU27SW

NGR: SU 2452 7021

Specimen nos: ARF 1023

The fauna includes shell fragments of the bivalves *Platyceramus* and *?Volviceramus involutus*.

Interpretation: The fauna suggests assignment to the lower *M. coranguinum* Zone, and the lower Seaford Chalk Formation might be inferred.

Conclusion: White Chalk Subgroup, (?lower) Seaford Chalk Formation; Coniacian, (?lower) *M. coranguinum* Zone.

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(5) New house construction site adjacent to garage in Kintbury, c. 400 m at 121° from Kintbury church, Berks.

1:50 000 267 (Newbury) 1:10 000 SU36NE

NGR: SU 3868 6682

Specimen nos: WMD 8854-8855

The fauna consists of calyx plates of the crinoid *Marsupites testudinarius*.

Interpretation: *M. testudinarius* is a zonal index for an interval near the base of the Newhaven Chalk Formation. Slightly younger chalk (probable mid *O. pilula* Zone) was reported from a nearby chalk pit in Kintbury (Osborne-White, 1902, 1907). This pit was located in the vicinity of [SU 3874 6660], but according to local residents was infilled in the late 1970s or early 1980s, and has subsequently been built over.

Conclusion: White Chalk Subgroup, lower Newhaven Chalk Formation; Santonian, *M. testudinarius* Zone.

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(6) Old chalk pit adjacent to footpath, c. 880 m at 049° from Lower Spray Farm, near Lower Green, Berks.

1:50 000 267 (Newbury) 1:10 000 SU36SE

NGR: SU 3536 6405

Specimen nos: WMD 8836 - 8846

The fauna includes the echinoids *Offaster pilula* and *Echinocorys truncata*.

Interpretation: The fauna is indicative of the upper *O. pilula* Zone (lower Subzone of abundant *O. pilula*), and by inference, the higher part of the Newhaven Chalk Formation (Mortimore, 1986).

Conclusion: White Chalk Subgroup, upper Newhaven Chalk Formation; Campanian, *O. pilula* Zone, lower Subzone of abundant *O. pilula*.

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(7) Trackside exposure, c. 940 m at 056° from Lower Spray Farm, near Lower Green, Berks.

1:50 000 267 (Newbury) 1:10 000 SU36SE

NGR: SU 3552 6404

Specimen nos: WMD 8847 - 8853

The fauna comprises asteroid test plates and oyster shell fragments, including *Pseudoperna boucheroni*.

Interpretation: Although biozonally undiagnostic, a rich oyster fauna, characterised particularly by *Pseudoperna boucheroni*, is characteristic of the *Uintacrinus socialis*, *Marsupites testudinarius*, *Uintacrinus anglicus* and basal *Offaster pilula* zones. In the context of the nearby record of the higher part of the *O. pilula* Zone (see (**6**) above), and the absence of any evidence of *Uintacrinus* or *Marsupites*, the basal *O. pilula* Zone (basal *E. depressula* Subzone) might questionably be inferred.

Conclusion: White Chalk Subgroup, ? middle Newhaven Chalk Formation; ? Campanian, ? lower *O. pilula* Zone, ? lower *E. depressula* Subzone.

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(8) Old chalk pit at south-east margin of Anville's Copse, c. 1 km due East of Mount Prosperous, near Ham, Berks.

1:50 000 267 (Newbury) 1:10 000 SU36SW

NGR: SU 3439 6449

Specimen nos: WMD 8934-8935

The two specimens are of the echinoid *Echinocorys elevata*. They were collected by D T Aldiss from a metre below the top of a c. 4 m exposure of soft, smooth, blocky, white chalk with poorly defined nodular flint horizons.

Interpretation: *Echinocorys elevata* is most characteristic of the *M. testudinarius* Zone, in the lower part of the Newhaven Chalk Formation.

Conclusion: White Chalk Subgroup, lower Newhaven Chalk Formation; Santonian, *M. testudinarius* Zone.

Appendix 1 - author citations for fossil species

Echinocorys elevata Brydone, 1912

Echinocorys truncata Griffith & Brydone, 1911

Marsupites testudinarius (Schlotheim, 1820)

Mimachlamys cretosa (Defrance *in* Brongniart 1822)

Offaster pilula (Lamarck, 1816)

Volviceramus involutus (J de C Sowerby, 1828)

References

Most of the references listed below are held in the Library of the British Geological Survey at Keyworth, Nottingham. Copies of the references may be purchased from the Library subject to the current copyright legislation.

MORTIMORE, R N. 1986. Stratigraphy of the Upper Cretaceous White Chalk of Sussex. *Proceedings of the Geologists' Association*, **97**(2), 97-139.

OSBORNE-WHITE, H J. 1902. Excursion to Kintbury, Inkpen and Woodhay. *Proceedings of the Geologists' Association*, **17**, 388-395.

OSBORNE-WHITE, H J. 1907. The geology of the country around Hungerford and Newbury. *Memoir of the Geological Survey of England and Wales* (Explanation of Sheet 267).

<table>
<tr><th rowspan="2">STAGE</th><th colspan="2">MACROFOSSIL BIOZONATION</th><th rowspan="2">LITHOSTRATIGRAPHY</th></tr>
<tr><td>Zone</td><td>Subzone</td></tr>
<tr><td rowspan="3">CAMPANIAN</td><td rowspan="2">O. pilula</td><td>Subzone of abundant O. pilula</td><td rowspan="4">Newhaven Chalk Formation.</td></tr>
<tr><td>E. depressula</td></tr>
<tr><td colspan="2">U. anglicus</td></tr>
<tr><td rowspan="2">SANTONIAN</td><td colspan="2">M. testudinarius</td></tr>
<tr><td colspan="2">U. socialis</td><td rowspan="2">Seaford Chalk Formation</td></tr>
<tr><td rowspan="2">CONIACIAN</td><td colspan="2">M. coranguinum</td></tr>
<tr><td colspan="2">M. cortestudinarium</td><td rowspan="2">Lewes Nodular Chalk Formation (pars)</td></tr>
<tr><td>TURONIAN (pars)</td><td colspan="2">S. plana (pars)</td></tr>
</table>

TABLE 1 The stratigraphy referred to in this report (not to scale)

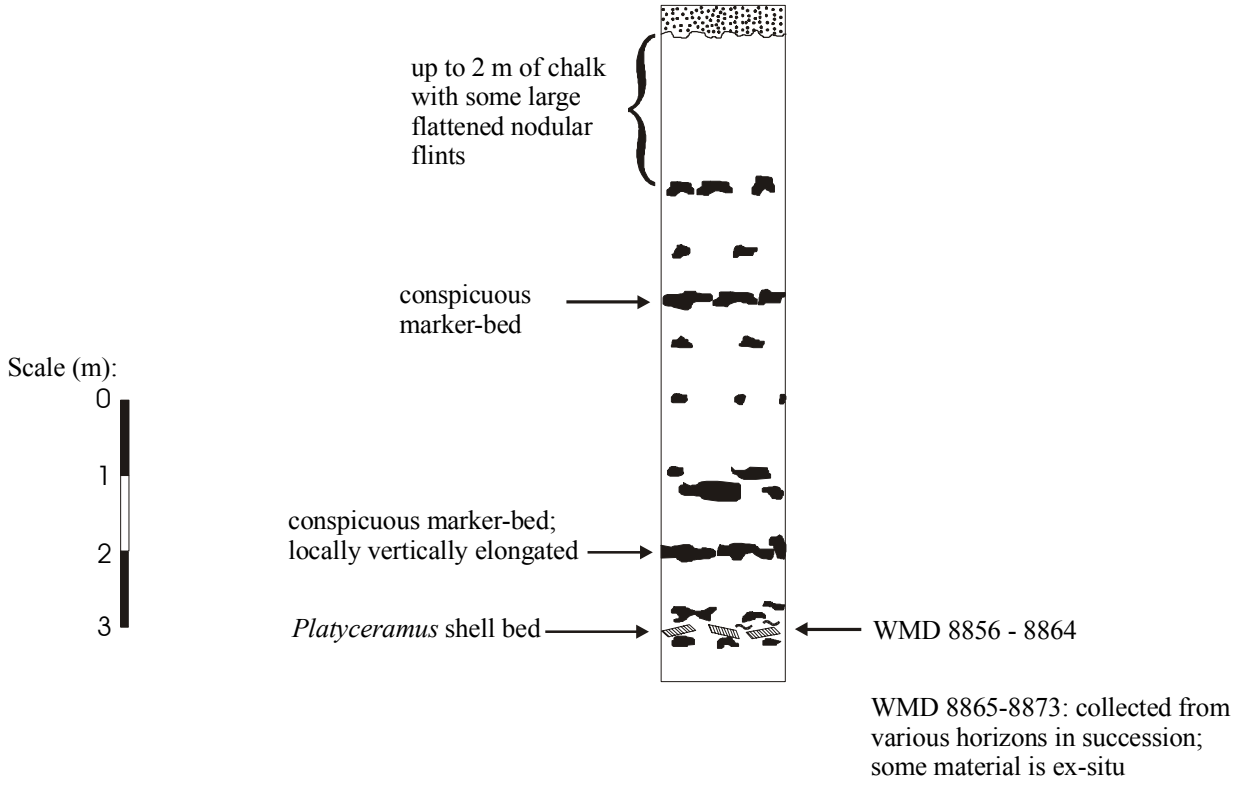

FIGURE 1. The chalk succession seen near Littlecote [SU 3104 7008] ((**1**) of report), and horizons of collected specimens.
For key to symbols see Fig. 3.

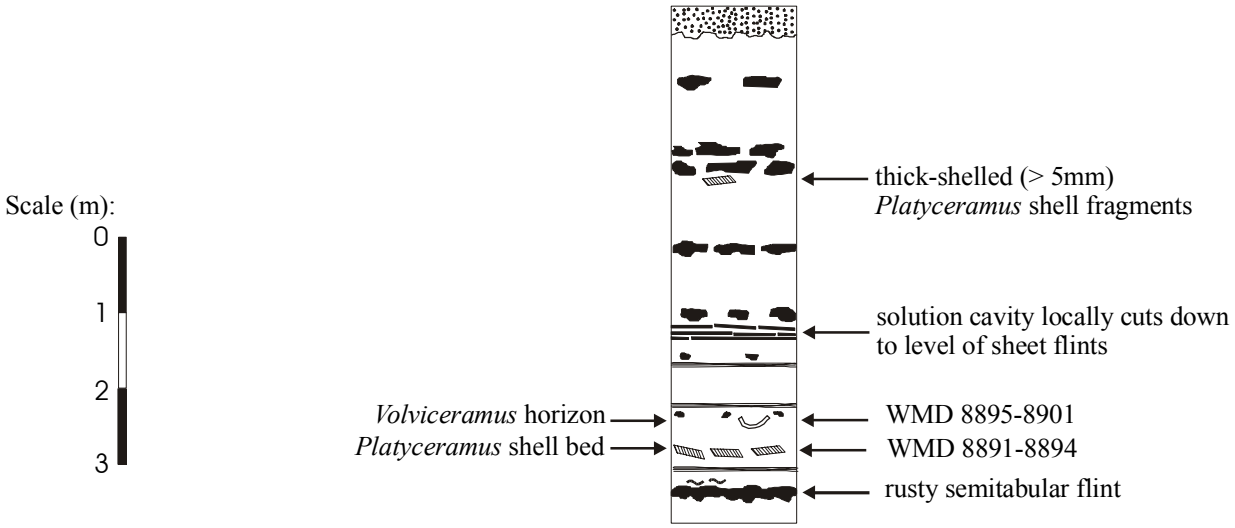

FIGURE 2. The chalk succession seen at Brick Hill chalk pit ((**2**) of report), and horizons of collected specimens.
For key to symbols see Fig. 3.

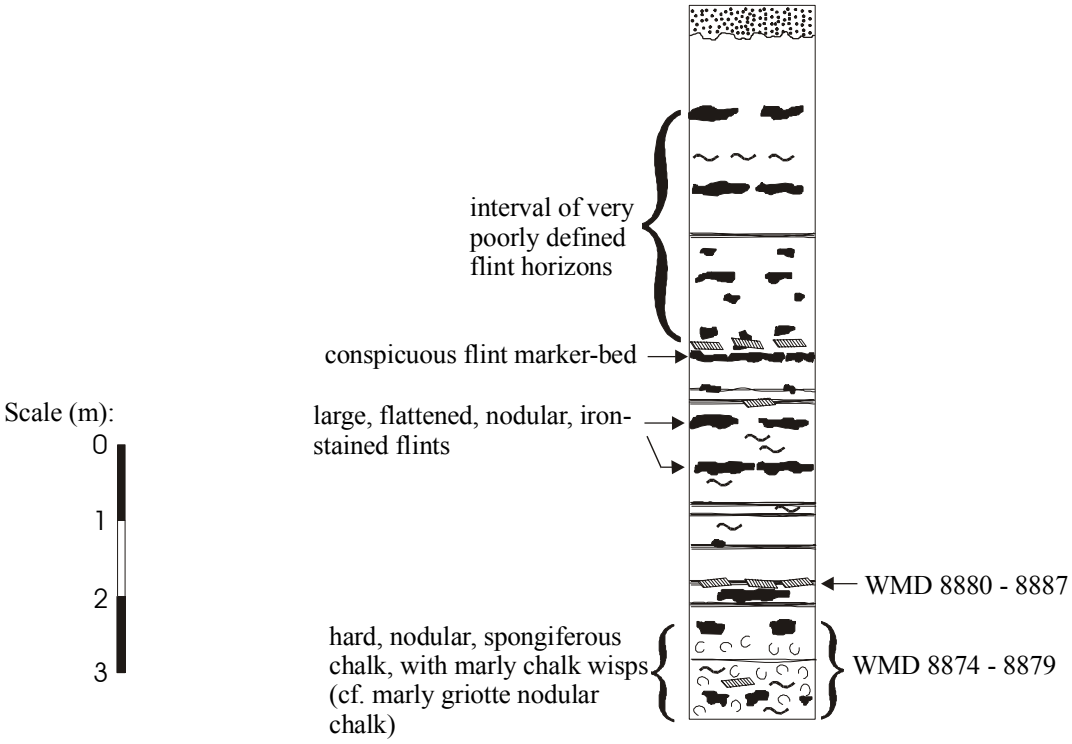

FIGURE 3. The chalk succession near Stitchcombe Farm [SU 2274 6927] ((**3**) of report) and horizons of collected specimens

KEY (figs 1-3):